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ABSTRACT

The model developed by the Computer Based Project for the Evaluation of Media for the Handicapped in Syracuse, New York to evaluate the use of captioned films for the deaf with mentally handicapped and emotionally disturbed children is briefly described, followed by a review of recent research conducted by the project staff. Among the areas which have been researched are: (1) pretest-posttest design modification, (2) effects of confirming correct answers, (3) paper and pencil vs. automated response modes, (4) alternatives to the multiple choice test format, and (5) nonverbal assessment techniques. Particular attention is given to findings comparing the effectiveness of color and black-white films and of captioned and noncaptioned materials. The results suggested that, while color and captions may have aesthetic and attention values, they do not significantly enhance the learning of cognitive information by educable mentally handicapped children. (Author/SL)

Research Report #744
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A PREVIEW OF RECENT FINDINGS ABOUT EMH STUDENTS TO FILMS

ABSTRACT

The model developed by the Computer Based Project in Syracuse, N. Y. to evaluate the use of captioned films for the deaf with mentally handicapped and emotionally disturbed children is briefly described, followed by a review of recent research conducted by the Project Staff. Among the areas which have been researched are: (1) pretest-posttest design modification, (2) effects of confirming correct answers, (3) paper and pencil vs. automated response modes, (4) alternatives to the multiple choice test format, (5) non-verbal assessment techniques, (6) attention variables (e. g. color, subject matter, etc.), and (7) captioning effects.

SPECIAL REPORT No. 744
COMPUTER-BASED PROJECT for the EVALUATION of MEDIA for the HANDICAPPED.

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BACKGROUND

The Computer Based Project for the Evaluation of Media for the Handicapped, based on contract #OEC-9-423617-4357 (616) between the Syracuse (N.Y.) City School District and the Media Services and Captioned Films Branch, Bureau of Education for the Handicapped (United States Office of Education) for the five year period July 1, 1969 through June 30, 1974. The major goal is to improve the instruction of handicapped children through the development and use of an evaluation system to measure the instructional effectiveness of films and other materials with educable mentally handicapped (EMH) children, in-service training and media support for special teachers, and studies related to the evaluation process and the populations used.

The Project has concentrated on the 600 films and 200 filmstrips from the Media Services and Captioned Films (BEH - USOE) depository; however, specific packages from Project LIFE, various elementary math curricula, and selected programs from Children's TV Workshop have also been evaluated. The evaluation model used requires that: 1) objectives of materials be specified and written; 2) instruments be constructed to test and measure effectiveness; and, 3) children be the major sources of evaluation information. A number of instruments and methodologies are employed in the gathering of cognitive and affective data from 900 EMH children and 80 special teachers to make the effectiveness decisions. Over half of the EMH population can neither read or write; therefore, a unique Student Response System (SRS) is employed, consisting of a twenty station G.E.-1000 SRS which can be operated in a group or individual recording mode and is connected to a remote computer system. The computer capabilities consist of remote telephone connections to the Rome (N.Y.) Air Development Command, the Honeywell time-shared network, and the Schenectady (N.Y.) G E Research and Development Center; and batch mode capabilities of the Syracuse City Schools, Syracuse University, and various commercial sources.

In-service and media support activities provide on-the-job training for teachers, teacher aides, equipment, and materials to the special teachers in the city schools. The research activities have centered around investigations and special problems related to the development of the evaluation model. The four major areas considered are: 1) testing effects, 2) captioning effects, 3) special student characteristics; and, 4) evaluation procedures validation.

Documentation of the major activities appear in the five annual reports and the 600 evaluations prepared on materials used. Staff members were encouraged to prepare special reports and the attached paper is one of these. The opinions expressed in this publication do not necessarily reflect the position or policy of the Computer Based Project, the United States Office of Education, or the Syracuse City School District, and no official endorsement by any of the agencies should be inferred.

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A PREVIEW OF RECENT FINDINGS ABOUT EMH STUDENTS TO FILMS

The Computer Based Project for the Evaluation of Media for the Handicapped was funded by the Bureau of Education for the Handicapped to develop a process to determine the effectiveness of 600 captioned films, intended for deaf students, on educable mentally handicapped (EMH) children. In the accomplishment of this assignment, some 80 investigations were carried out to verify assumptions and test techniques being employed on the EMH population and on the films and filmstrips provided from the Media Services and Captioned Film Branch depository.

The Syracuse City Schools housed the Project in two large rooms in the basement of an inner-city school. Here a facility was installed to store the materials, provide staff space and a projection room for 15 students. In this room a student response system (SRS) was installed to automate the data collection into a remote telephone line to Rome Air Development Command computers. The City schools had a population of 900 EMH children from six to sixteen years of age located in 80 teaching stations across the city. Fourteen of these were located in the same building as the project facility. The others were scattered in ten other buildings and were either transported to the center or were shown the media in the classroom.

The purpose of this paper is to highlight recent findings particularly those dealing with color and black-white films and with captioned and non-captioned materials.

In order to explain these studies I want to first point out the bases for the assumptions made. The design of the evaluation process is a simple pretest-treatment-posttest design. At first this was rather strictly followed using the same children. Later it was modified to use independent samples for the pretest and posttest data when it was determined that the pretest lengthened the required attention span and consequently lowered the posttest scores.

Spaid and Plotnick (1973) found a significant gain in posttest score with EMH subjects in a filmstrip treatment sequence. Two pretests were administered prior to the viewing of the filmstrip. This design would allow the determination of any test effects that might result by the pretest. No significant contributions were found from the pretests, but significant changes were found after viewing the filmstrip. These changes (gains) have been consistently verified in every investigation where pretest and posttest scores are compared.

Comparisons of data collection techniques have been involved in several studies. Anastasio (1972) found no significant differences between confirming the correct answer after the group had responded in the SRS and not confirming the answers in terms of improving the number of correct scores. However, the confirmation provided an observable motivation response in the form of audible cheers and seemed to sustain the interest in answering the items.

Bond (1971) found no significant differences in the number of correct answers between the scores from paper and pencil responses and those from the SRS. Again the motivation provided by giving confirmation after each response seemed to highlight the activity at a greater

level than the paper and pencil mode. In another study Bond and Flowers (1972) set up a situation in the SRS where a "2" response was the correct answer for every question in order to test the use of answer patterns by EMH children. After seven items only twenty percent of the population seemed to discover the "secret," even with confirmation after each item, that "2" was the correct response.

Alternate techniques to the multiple-choice item were also attempted. Using open-ended questions in personal interviews, it was ascertained that there was very little difference between the younger (primary) and older (secondary) EMH students. Most replies were short answers, often employing a simple yes or no. The setting, sequence of events, and simple cause and effect relationship could be identified but not necessarily verbalized. The specific film had implied father-daughter, boy-girl, and peer relationships and these were not identified. It was concluded that the low verbal level observed in these EMH children would make the employment of semantic scales or differentials impossible.

A photo sequencing task was tested by Anastasio (1973) in which the EMH student was asked to place a series of photos in the order representing the concepts presented in lieu of answering questions about the concept. He found non-significant but positive correlations between judged verbal and visual abilities and the correct sequenced photos. There was a significant difference between the scores of those who had seen the film and those who had not. Another non-verbal technique involved the observation of hand position on the body based on

Body Image theories (Freud, 1927; Fisher, 1958). Two films were selected; one had a judged high affective message whereas the other had a heavy factual content. It was found that the hands were observed to be placed on the body and legs for the first film at a much higher frequency than on the second film. The second had a much higher incidence of head-and external-placement and almost no body touching. Body image theories suggest the first as "protective" or more affective and the latter as "cognitive" or thinking activity. The investigation demonstrated that differential findings are observable from non-verbal responses and suggests that interpretations of the responses could be logically assigned to them.

The foregoing summary has indicated that EMH children do give information and exhibit behaviors which could be interpreted and related to the mediated experiences to which they are being subjected. What are some of these relationships?

An analysis of over 20,000 responses to cognitive items presented after viewing films has indicated that achievement variables on reading, arithmetic, and spelling measures and IQ scores account for only six percent of the variance. Arithmetic scores were the highest predictors, accounting for four percent, and full scale IQ accounts for one percent. Budoff (1971) found similar results when a sample of nine films were found to correlate positively with the series subtest on the Learning Potential instrument he was developing. The posttest scores on six of the nine films were significantly correlated with children's achievement scores ($p=.05$).

The posttest scores for films (not separating color and black-white) were highest for health and language arts films and lowest for fine arts films. Higher scores were generally made on color films by five percent (when not separated by subject matter) and the difference was not significant. In terms of gain scores, the highest gains were for science and social studies and lowest for guidance and health films. Black-white films had generally higher gain than color films, with only higher posttest scores in fine arts. Black-white seemed to have lower pretests, again not significantly different.

	Posttest	Attn	Rank
Language	65.8	88.1	3
Health	63.6	90.0	1
Guidance	61.1	88.0	2
Soc Studies	56.7	89.9	4
Math	55.6	76.0	7
Science	55.2	83.2	5
Fine Arts	52.3	83.0	6

These posttest scores were related to an attention measure. When ranked by content area, the top four subject areas by posttest are also the top four in attention. These are health, social studies, language arts and guidance. Lowest attention was for math films. The younger students had higher attention for color films and the older students attended more to black-white films. The cognitive content of the films shown to each level may be an intervening variable.

	Color	B-W
PRIMARY	86.8	84.7
INTERMEDIATE	86.0	87.4
SECONDARY	85.4	88.9

Mean Attention

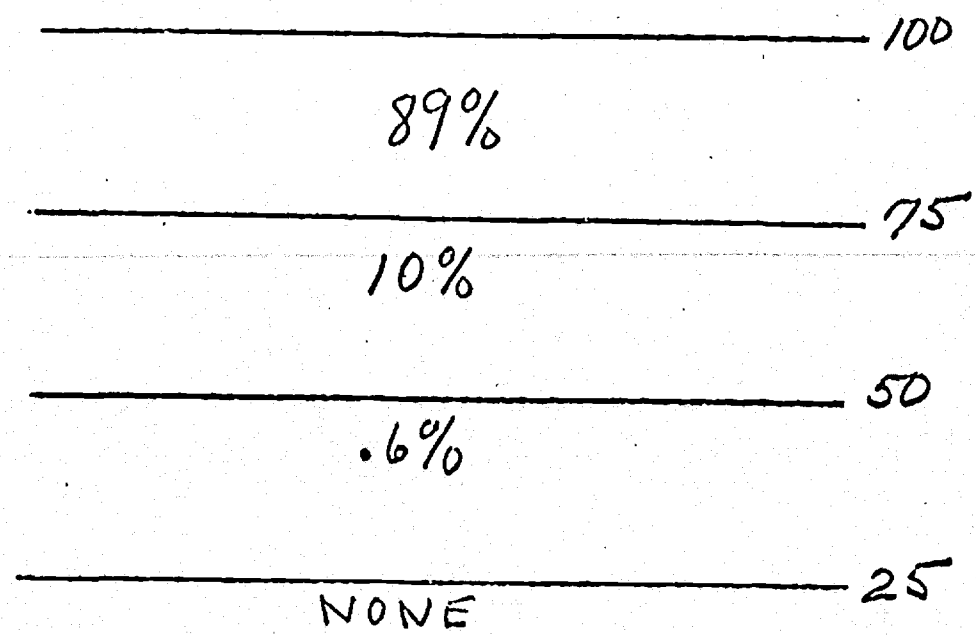
The attention measurement is made by observing five students as they view a film and record on a five second interval the frequency of those viewing. This string of observations is summarized into a time series profile.

The two hundred films available in the data base (20,000 records) have mean attention which varies usually between 75 and 85 percent of the children watching all the time. This results in a relatively small variance located at the upper end of the scale. Repeated observations tend to give a similar curve and rather consistent mean values.

Eight Profiles	df	SS	MS	F
Between Groups	4	289.7	72.4	.31
Residual	35	8086.2	231.0	
Total	39	8375.8		

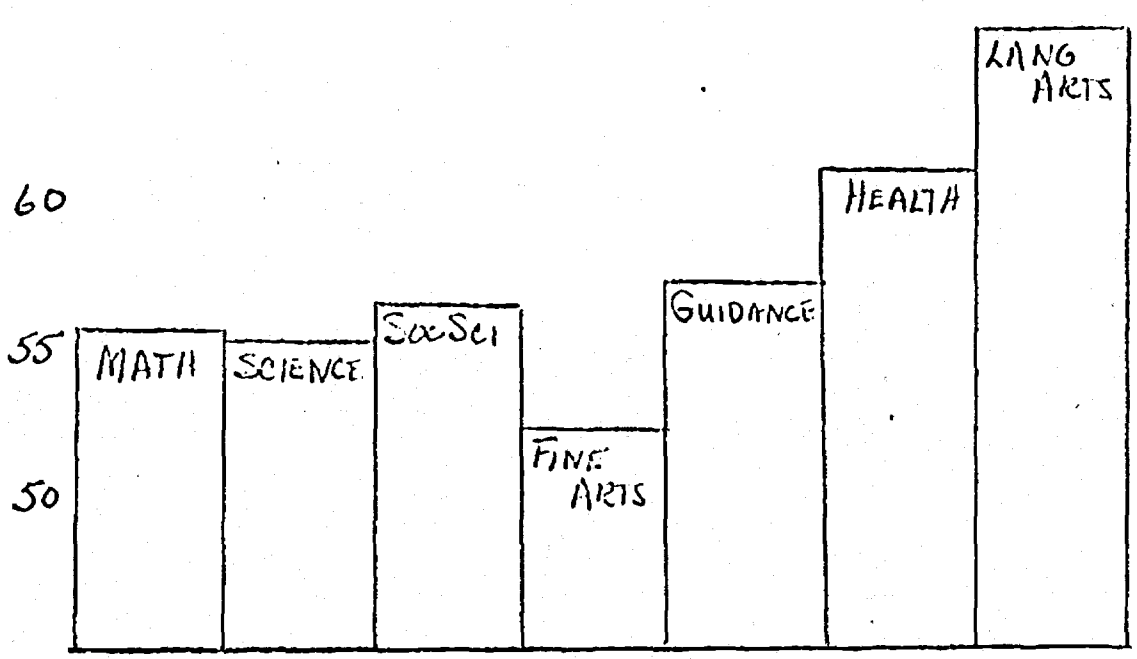
Five Profiles	df	SS	MS	F
Between Groups	7	983.8	140.5	2.06
Residual	32	2183.9	68.2	
Total	39	3167.8		

For instance a study of five films with eight separate profiles produced no significant deviations. Another study of six films with five profiles each produced a significant difference with one film "Rubber in Today's World," which was a rather heavy content film. Arranging the 200 mean attention index into a quartile scale further points out the small range - .6 percent in 25-49; 10 percent in 50-74; and 89 percent in 75-100.

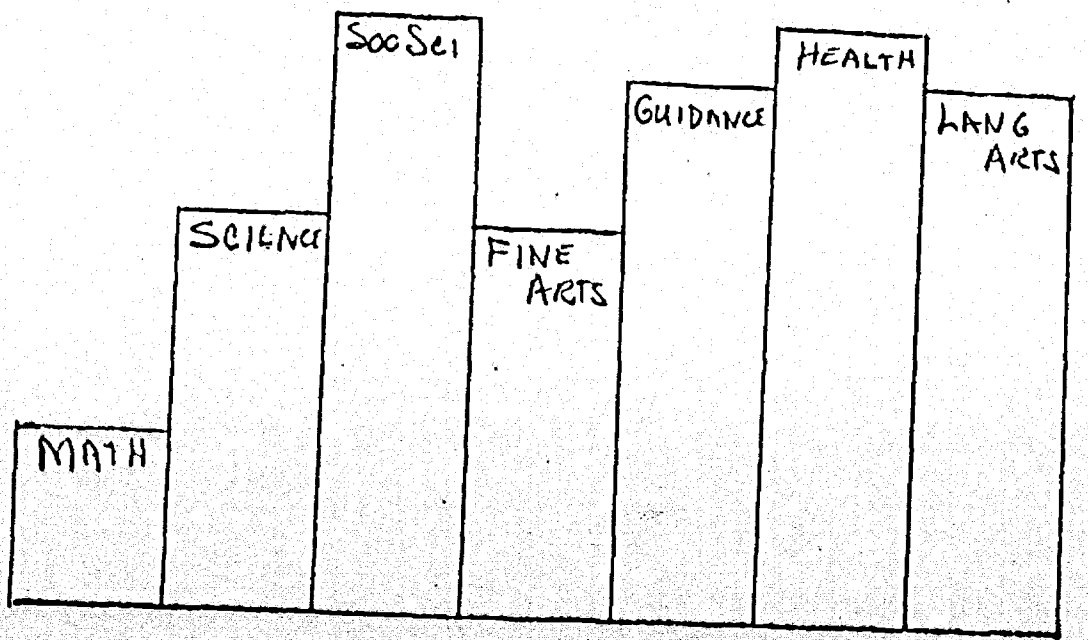


MEAN ATTENTION BY QUARTILE

The profile of the bar graphs for posttest scores and mean attention is almost the same when using a breakdown by content area.



POST TEST SCORES



AVERAGE ATTENTION

The first two variables singled out to be reported here are color and black-white films. From the 600 films available, those with pretest and posttest data were selected and processed with a one way ANOVA to detect differences between the tests. Sixty-six films resulted in a mean pretest of 38.8 percent correct and a mean posttest of 51 percent correct with a standard deviation of 10 for both. A

One-Way ANOVA

	df	SS	MS	F
Color/ BW	1	1071.43	1071.43	7.45*
Residual	82	11798.38	143.89	
Total	83	12869.81		

Critical value $F_{.95\ df=1,60} = 4.00$

significant F value of 7.45 was obtained for p=.05. Twenty-one films of each type (color or black-white) were selected sequencially as they appeared on a listing, and the pretest and posttest scores were obtained. A two-way analysis of variance was used to summarize the data.

Two-Way ANOVA

	SS	df	MS	F
Pre-Post	792.10	1	792.10	8.79*
Color/ BW	52.90	1	52.90	.59
Interaction	40.00	1	40.00	.44
Error	7208.00	80	90.13	
Total	8093.00	83		

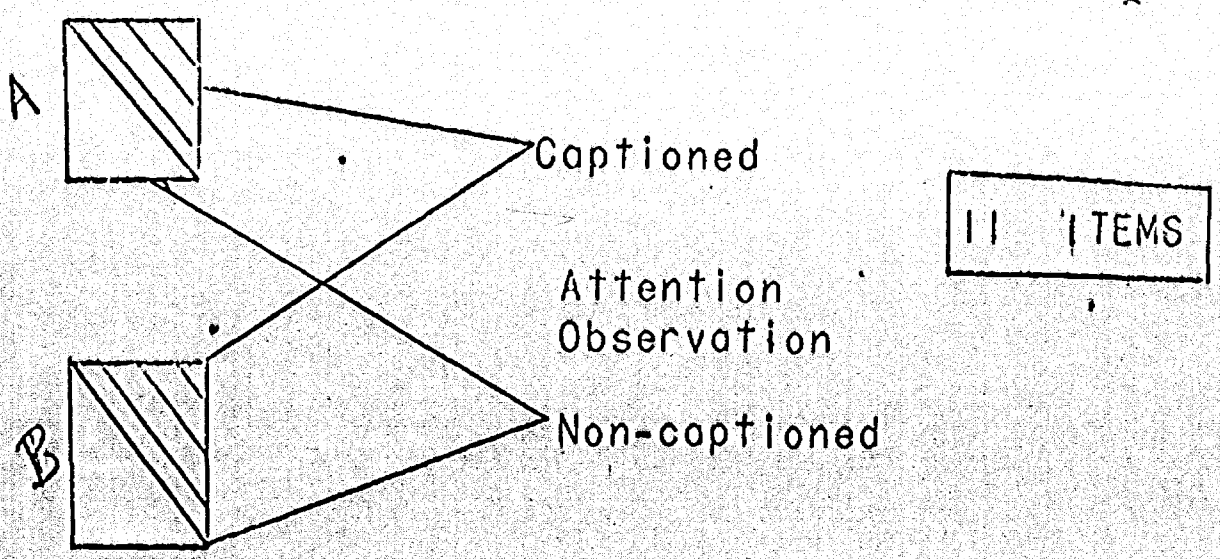
Critical value $F_{.95\ df=1,80} = 3.96$

The resulting analysis indicated no significant differences between color and black-white or for interactions between tests and color. Pretest and posttest differences were significant, F=8.8.

These findings are essentially the same as was found from the analysis of the 20,000 responses. The values of the sample are reversed from that of the total sample. Color scored higher on posttest than did black-white in the larger population, and black-white gained more. But these differences could be attributed to sample variation.

The second two variables are captioned and non-captioned effects. Two studies were conducted to isolate the variables in two different measurements - cognitive differences and preference or attention differences.

The first study was conducted using a captioned and non-captioned version of the same film "1536-Magnets and Their Uses." A comparison of the script of the audio sound track and the captioning revealed no essential differences in the number of words used or their rated difficulty by reading level. Two EMH classrooms at each primary and in-



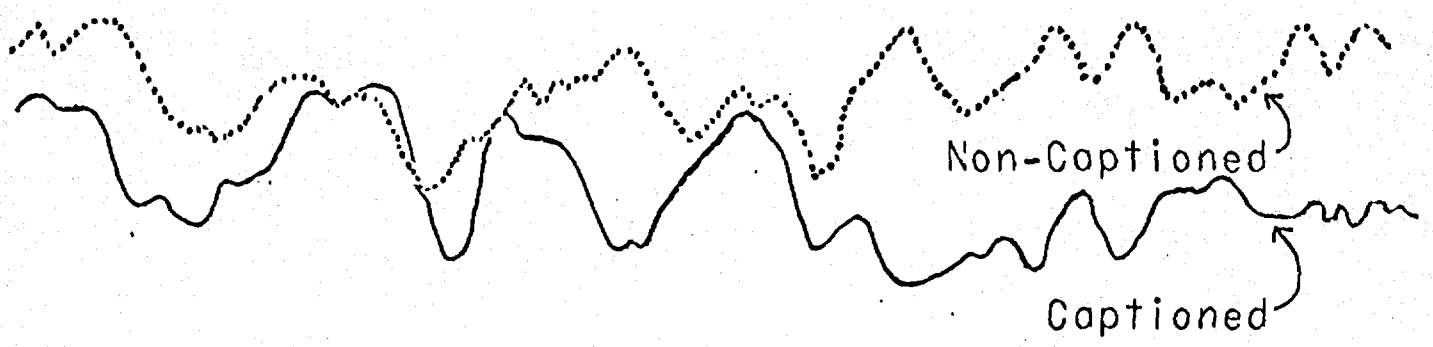
termediate level, were randomly assigned to view either the captioned or non-captioned version which were shown in adjacent classrooms simultaneously. Following the film showing the children moved back to their own room and were administered a cognitive test of eleven items on magnets. The attention profiles were taken during the showings.

	S S	M S	df	F
Caption	301.79	301.79	1	2.30
Levels	22480.07	22480.07	1	171.24 **
Interaction	171.50	171.50	1	1.31
Error	6826.57	131.28	52	
Total	29779.93		55	

** Tabled $F^{.95}_{1,48} = 4.043$

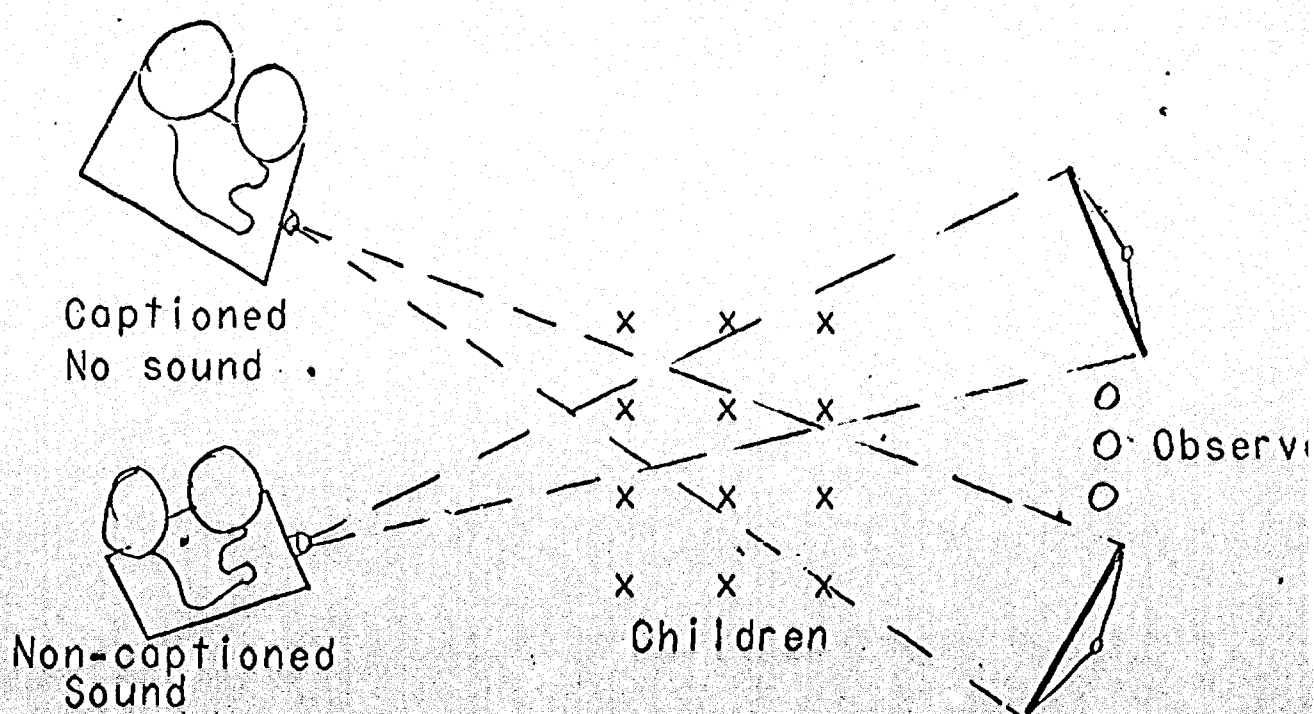
The results were summarized in a two-way analysis of variance using captioning and non-captioning as one set of variables and primary and intermediate as the other set. No significant differences were found on the cognitive test between captions and levels. A significant ($p=.05$) difference was found ($F=171.0$) between the levels, with the intermediate children doing much better on the test than the primary children. Significant differences (using Chi-square) were also noted between the attention profiles of the captioned and non-captioned showings. The non-captioned groups had a higher profile than did the

captioned groups. Note the similarities in the trace of the two profiles mentioned earlier in this review.

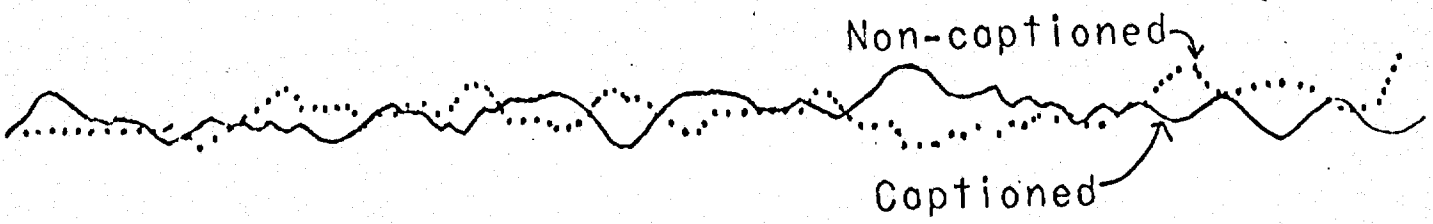


1556 Magnets Independent Showing

A second study to determine preference to the captioned or non-captioned version was organized where both versions of the film were shown in the same room simultaneously. The attention observation



was modified to add the dimension of which screen was being watched. The resulting attention profiles were summarized and graphed for each film. Here we see the greater attention to the non-captioned version, found in the first study, was not verified. Subjective comments of the three observers verified the fact that the child seemed to watch the screen closest to him rather than to indicate any preference. The novelty of having <u>two</u> stimuli in a room may have also confounded the



profile. There may have also been a systematic variable working in study I to give the differences in profile; however, this is unlikely. The cognitive test responses were essentially the same as in study I with a mean of 29 for primary and 65 for intermediate level.

The findings of the differences between color and black-white films seems to suggest that the dimension of color does not significantly enhance the learning of cognitive information. The addition of captions does not seem to enhance learning in EMH children; in fact, it may even be suggested that the addition of captions may cause less attention to be paid to the presentation.

The generally higher cost of color and captioning does not seem justified on the basis of academic learning for EMH children. The aesthetic and attention values, particularly for younger EMH children, may be important concerns to consider in order to justify the added expense.

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